



Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 3708-7 (2005): Methods of Test for Natural Rubber Latex,
Part 7: Determination of Volatile Fatty Acid Number [PCD
13: Rubber and Rubber Products]

“ज्ञान से एक नये भारत का निर्माण”

Satyanaaranay Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



PROTECTED BY COPYRIGHT

IS 3708 (Part 7) : 2005
ISO 506 : 1992

भारतीय मानक
प्राकृतिक रबड़ लैटेक्स की परीक्षण पद्धतियाँ
भाग 7 वाष्पशील वसा-अम्ल संख्या ज्ञात करना
(दूसरा पुनरीक्षण)

Indian Standard

METHODS OF TEST FOR NATURAL
RUBBER LATEX

PART 7 DETERMINATION OF VOLATILE FATTY ACID NUMBER
(*Second Revision*)

ICS 83.040.10

© BIS 2005

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

NATIONAL FOREWORD

This Indian Standard (Part 7) (Second Revision) which is identical with ISO 506 : 1992 'Rubber latex, natural, concentrate — Determination of volatile fatty acid number' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendations of the Rubber and Rubber Products Sectional Committee and approval of the Petroleum, Coal and Related Products Division Council.

The text of ISO Standard has been proposed to be approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

The Technical Committee responsible for the preparation of this standard has reviewed the provisions of the following International Standards and has decided that they are acceptable for use in conjunction with this standard:

<i>International Standard</i>	<i>Title</i>
ISO 123 : 1985	Rubber latex — Sampling
ISO 124 : 1992	Rubber latices — Determination of total solids content
ISO 126 : 1989	Natural rubber latex concentrate — Determination of dry rubber content

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard
**METHODS OF TEST FOR NATURAL
RUBBER LATEX**
PART 7 DETERMINATION OF VOLATILE FATTY ACID NUMBER
(Second Revision)

1 Scope

This International Standard specifies a method for the determination of the volatile fatty acid number of natural rubber latex concentrate.

The method is not necessarily suitable for latices from natural sources other than *Hevea brasiliensis* and is not applicable to compounded latex, vulcanized latex, artificial dispersions of rubber or synthetic rubber latices.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 123:1985, *Rubber latex — Sampling*.

ISO 124:1992, *Rubber latices — Determination of total solids content*.

ISO 126:1989, *Natural rubber latex concentrate — Determination of dry rubber content*.

3 Definition

For the purposes of this International Standard, the following definition applies.

3.1 volatile fatty acid (VFA) number of latex concentrate: The number of grams of potassium hydroxide equivalent to the volatile fatty acids in latex concentrate containing 100 g of total solids.

NOTE 1 If substances have been added to the latex which produce volatile acids on acidification with sulfuric acid, the volatile fatty acid number is high and does not represent the volatile fatty acid content without correction.

4 Principle

A test portion is coagulated with ammonium sulfate and a portion of the resultant serum is separated and acidified with sulfuric acid. The acidified serum is steam-distilled and the volatile acids present in the test portion are determined by titration of the distillate with a standard volumetric barium hydroxide solution.

5 Reagents

During the analysis, use only reagents of recognized analytical quality, and only distilled water or water of equivalent purity.

5.1 Ammonium sulfate, approximately 30 % (*m/m*) solution.

5.2 Sulfuric acid, approximately 50 % (*m/m*) solution.

5.3 Barium hydroxide, standard volumetric solution, $c[Ba(OH)_2] = 0,005 \text{ mol/dm}^3$, standardized by titration with potassium hydrogen phthalate and stored in the absence of carbon dioxide.

5.4 Indicator solution: either bromothymol blue or phenolphthalein solution, 0,5 % (*m/m*) in a mixture of approximately equal volumes of ethanol and water.

6 Apparatus

Ordinary laboratory apparatus and

6.1 Steam-jacketed distillation apparatus (Markham still), conforming essentially to figure 1. As an alternative to the one-piece apparatus illustrated, a ground-glass joint may be inserted between the distillation vessel and the condenser.

6.2 Steam-bath, or

6.3 Water-bath, capable of being maintained at a nominal temperature of 70 °C.

6.4 Pipettes, of capacity 5 cm³, 10 cm³, 25 cm³ and 50 cm³.

6.5 Burette, of suitable capacity.

7 Sampling

Carry out the sampling in accordance with one of the methods specified in ISO 123.

8 Procedure

8.1 If the total solids content and dry rubber content of the latex concentrate are not known, determine them in accordance with ISO 124 and ISO 126, respectively.

8.2 Into a beaker weigh, to the nearest 0,1 g, about 50 g of latex concentrate. Accurately add 50 cm³ of the ammonium sulfate solution (5.1) from a pipette (6.4), while stirring the latex concentrate. Either place the beaker on the steam-bath (6.2) or in the water-bath (6.3), maintained at 70 °C, and continue stirring the latex concentrate until it coagulates. Cover the beaker with a watch-glass and leave it on or in the bath for a total period of 15 min. Decant the serum which exudes through a dry filter paper. Transfer the coagulum to a mortar and press out more serum by kneading it with a pestle. Filter this serum through the same filter. Pipette 25 cm³ of the filtered serum into a dry 50 cm³ conical flask and acidify it by accurately adding 5 cm³ of the sulfuric acid solution (5.2). Mix well by swirling the flask.

With certain latex concentrates, in particular those preserved with potassium hydroxide, a fine precipitate may form during the acidification step. This precipitate shall be removed by filtration through a fresh dry filter paper before proceeding with the distillation process.

Pass steam through the apparatus (6.1) for at least 15 min. With steam passing through the outer jacket of the apparatus (steam outlet open), introduce into the inner tube 10 cm³ of the acidified serum by pipette (6.4). If foaming is a difficulty, 1 drop of a suitable antifoaming agent may be added. Place a

100 cm³ graduated cylinder under the tip of the condenser to receive the distillate. Partially close the steam outlet to divert steam into the inner tube. Pass steam gently at first, then fully close the steam outlet and continue distilling at a rate of 3 cm³/min to 5 cm³/min until 100 cm³ of distillate has been collected.

Transfer the distillate to a 250 cm³ conical flask and eliminate any dissolved carbon dioxide from the distillate by passing through it a stream of air free from carbon dioxide at a rate of 200 cm³/min to 300 cm³/min for approximately 3 min. Titrate with the barium hydroxide solution (5.3), using one of the indicators specified (5.4).

8.3 Carry out a duplicate determination (see 8.2) with a fresh 50 g test portion of latex concentrate.

9 Expression of results

Calculate the volatile fatty acid (VFA) number using the formula

$$\left[\frac{134,64cV}{m \text{TSC}} \right] \times \left[50 + \frac{m(100 - \text{DRC})}{100\rho} \right]$$

where

c is the actual concentration, expressed in moles per cubic decimetre, of the barium hydroxide solution (5.3);

V is the volume, in cubic centimetres, of barium hydroxide solution required to neutralize the distillate;

m is the mass, in grams, of the test portion;

DRC is the dry rubber content, expressed as a percentage by mass, of the latex concentrate;

TSC is the total solids content, expressed as a percentage by mass, of the latex concentrate;

ρ is the density, in megagrams per cubic metre, of the serum¹⁾;

134,64 is a factor derived from the relative molecular mass of potassium hydroxide, its equivalence to barium hydroxide and those parts of the serum acidified and distilled.

Repeat the test if the results of the duplicate determinations do not agree to

— within 0,01 units when the actual VFA number is 0,10 units or less;

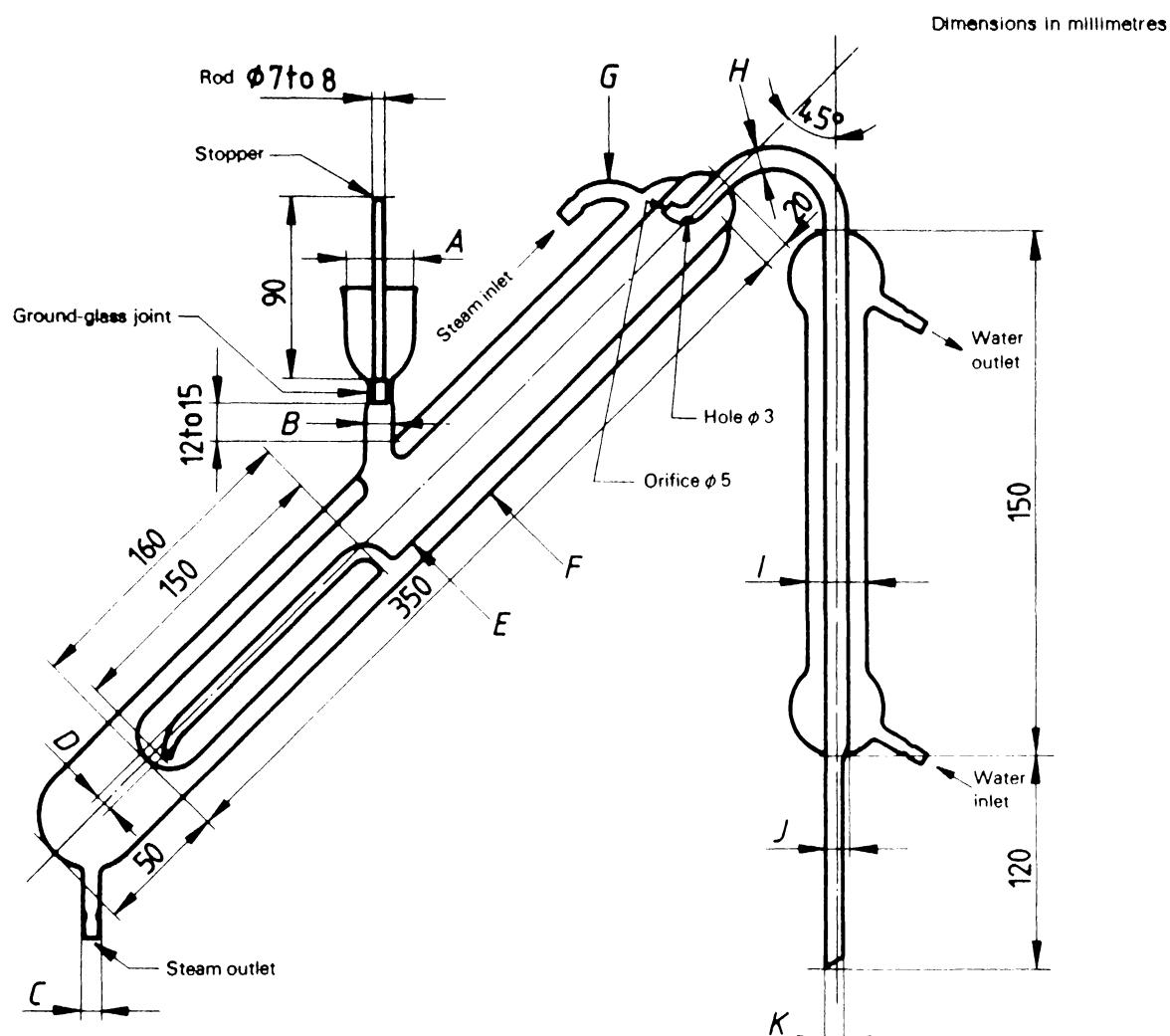
1) $\rho = 1,02 \text{ Mg/m}^3$ for centrifuged or creamed latex concentrates.

- within 10 % when the actual VFA number is greater than 0,10 units.

10 Test report

The test report shall include the following particulars:

- a) a reference to this International Standard;
- b) all details necessary for the identification of the test sample;
- c) the results, and the units in which they have been expressed;
- d) any unusual features noted during the determination;
- e) any operations not included in this International Standard or in the International Standards to which reference is made, and any operations regarded as optional.



Symbol	A	B	C	D	E	F	G	H	I	J	K
External diameter	29 to 32	13 to 14	9 to 10	5 to 6	25 to 27	44 to 48	9 to 10	15 to 17	20 to 22	11 to 12	9 to 10
Wall thickness	1 to 1.5	1 to 1.5	0.75 to 1.25	0.75 to 1.25	1 to 1.5	1 to 2	0.75 to 1.25	1.5 to 2	1 to 1.5	0.75 to 1.25	0.75 to 1.25

Figure 1 — Steam-jacketed distillation apparatus (Markham still)

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publication), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. PCD 13 (2172).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

website : www.bis.org.in

Regional Offices:

Telephones

**Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg
NEW DELHI 110002**

{ 2323 7617
 2323 3841

Eastern : 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi
KOLKATA 700054

{ 2337 8499, 2337 8561
 { 2337 8626, 2337 9120 }

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022

$$\left\{ \begin{array}{l} 260\ 3843 \\ 260\ 9285 \end{array} \right.$$

Southern : C.I.T Campus, IV Cross Road, CHENNAI 600113

{ 2254 1216, 2254 1442
 { 2254 2519 2254 2315

**Western : Manakalaya, E9 MIDC, Marol, Andheri (East)
MUMBAI 400093**

{ 2832 9295, 2832 7858
 { 2832 7891 2832 7892

Branches: AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.